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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,311	03/25/2005	Jacob M Jensen	1505-66542-02	8643

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EXAMINER

LAM, CATHY FONG FONG

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 10/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/529,311

Applicant(s)

JENSEN ET AL.

Examiner

Cathy Lam

Art Unit

1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) 17-30 and 33-45 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16, 31, 32 and 46 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>3-25-2005</u> . | 6) <input type="checkbox"/> Other: _____ |

In view of the respond filed on October 02, 2006, applicant has elected the product to be examined for the time being. Claims 17-30, 33-45 were non-elected method claims.

Election/Restrictions

1. This application contains claims 17-30 & 33-45 are drawn to an invention nonelected with traverse. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Specification

The disclosure is objected to because of the following informalities: on page 11, "the layer pairs **16**" appears to be an error. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. Claims 13 & 15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 13, it is vague and indefinite, as to whether "the metal" is referring to the "a metal capping layer" in claim 13? Clarification is required.

In claim 15, it is vague and indefinite, as to whether "SiNi" is the same as "NiSi"? The examiner is taking the position that they are the same for the purpose of examination.

Claim Objections

3. Claims 31, 32 and 46 are objected to because of the following informalities: they are product claims but depended upon a method claim(s). Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claims 1-4, 6, 11, 15, 31-32 & 46 are rejected under 35 U.S.C. 102(e) as being anticipated by Barnak et al (US 6849509).

Barnak teaches a gate electrode comprised of alternately laminating a first metal layer (106), a second metal layer (108) onto a substrate (102) (Fig. 2).

The substrate may be a silicon substrate or it may contain a silicon containing surface layer (104) (col 2 L 60-64 & col 3 L 5-8).

The first metal layer (106) and the second metal layer (108) are alternately stacked over the substrate (102), wherein the first metal layer (106) & the second metal layer (108) can be metals that form an inter-metallic with another metal, such as nickel or metal silicides (col 3 L 62-66 & col 4 L 20-24). The first and second metal layers comprised of different materials from each other (col 4 L 20-21).

The number of alternately layer pairs ranges from 2 to 10 (col 5 L 1-5). The first and second metal layers are extremely thin, the (total) stacked thickness is from 50-200 Å (or 5-20 nm) (col 5 L 8-10) (the examiner assuming if there is only 2 layer pairs, then it would be 2.5 nm per each layer pair). In fact, both the first and second metal layers have the thickness ranging from 2.5-100 Å, preferably from 5 to 30 Å (i.e. 0.5-3 nm) (col 3 L 53-54, col 4 L 11).

The metal layers formed a single phase metal alloy, with the phase can be either amorphous or crystalline (col 5 L 58-63).

Claim Rejections - 35 USC § 103

6. Claims 1-16, 31-32 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnak et al (US 6849509) in view of Ishizaka et al (US 5047111).

Barnak teaches the present invention but is silent about the electrical conductivity of the multilayer structure nor does it teach the nickel and silicon molar ratio. Barnak also is silent about having a nickel capping layer.

Ishizaka discloses a multilayer structure comprised of alternately laminating a metal layer and a silicon layer onto a single crystal silicon substrate (col 1 L 59-61).

The metal layer is a nickel layer, it is alternately laminated with a silicon layer and deposited onto a silicon substrate (Fig. 2(a) & col 2 L 20-25).

Depending on the annealing process, a nickel mono-silicide compound layer can be formed (col 3 L 16-19).

The films are amorphous or microcrystalline (col 3 L 28-29). Since applicant has not clearly stated in the base claim that the multilayer structure is an amorphous nickel mono-silicide (i.e. NiSi), the examiner is taking the position that Ishizaka teaches the present invention, and that Ishizaka's multilayer structure inherently entails the same electrical conductivity.

Furthermore, one skill in the art would fabricate a multilayer structure with desired nickel to silicon ratio and also adding a nickel capping layer because it is a matter of design choice. Applicant in the specification stated that capping layer is optional and it would have been obvious that adding a slightly thicker nickel capping layer would ensure the structure to become a nickel rich silicide.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy Lam whose telephone number is (571) 272-1538. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Cathy Lam
Primary Examiner
Art Unit 1775

cfl
October 13, 2006